

2.2A, 25V Step-down Switching Regulator

DESCRIPTION

Demonstration circuit 1273 is a monolithic step-down DC/DC switching regulator featuring LT1938. The demo board is designed for 3.3V output from a 4.5V to 25V input. The wide input range of the LT1938 allows a variety of input sources. The typical sources are automotive batteries, wall adaptors and industrial supplies. The programmed 800 kHz switching frequency allows the use of small, low cost inductor and ceramic capacitors, resulting in low, predictable output ripple. The current mode control scheme creates fast transient response and good loop stability. The gate drive of the internal switch is boosted to a voltage that is higher than the V_{in} to ensure saturation of the switch. The LT1938's integrated boost diode reduces the parts count. The RUN/SS pin can be used to set the part in micropower shutdown mode, re-

ducing the supply current to less than 1uA. The RUN/SS pin can also be used to program soft start. In this mode, the RUN/SS pin is driven through an external RC filter to create a voltage ramp on this pin. The soft start function reduces the input current surge during start-up.

The LT1938 datasheet gives a complete description of the part, operation and application information. The datasheet must be read in conjunction with this quick start guide for demo circuit 1273.

Design files for this circuit board are available. Call the LTC factory.

LT, LTC and LT are registered trademarks of Linear Technology Corporation. ThinSOT and PowerPath are trademarks of Linear Technology Corporation.

Performance Summary for Step-down Switching Regulator ($T_A = 25^{\circ}\text{C}$)

PARAMETER FOR BUCK REGULATOR	CONDITION	VALUE
Minimum Input Voltage		4.5V
Maximum Input Voltage		25V
Output Voltage V_{OUT}		3.3V +/- 4%
Maximum Output Current		2.2A
Typical Switching Frequency		800kHz

QUICK START PROCEDURE

Demonstration circuit 1273 is easy to set up to evaluate the performance of the LT1938. Refer to Figure 1 for proper measurement equipment setup and follow the procedure below:

NOTE. When measuring the input or output voltage ripple, care must be taken to avoid a long ground lead on the oscilloscope probe. Measure the input or output voltage ripple by touching the probe tip directly across the V_{in} or V_{out} and GND terminals. See Figure 2 for proper scope probe technique.

1. Place JP1 on the RUN position:
2. With power off, connect the input power supply to V_{in} and GND.

3. Turn on the power at the input.

NOTE. Make sure that the input voltage does not exceed the maximum input voltage.

4. Check for the proper output voltage.

NOTE. If there is no output, temporarily disconnect the load to make sure that the load is not set too high.

5. Once the proper output voltages is established, adjust the load within the operating range and observe the output voltage regulation, ripple voltage, efficiency and other parameters.

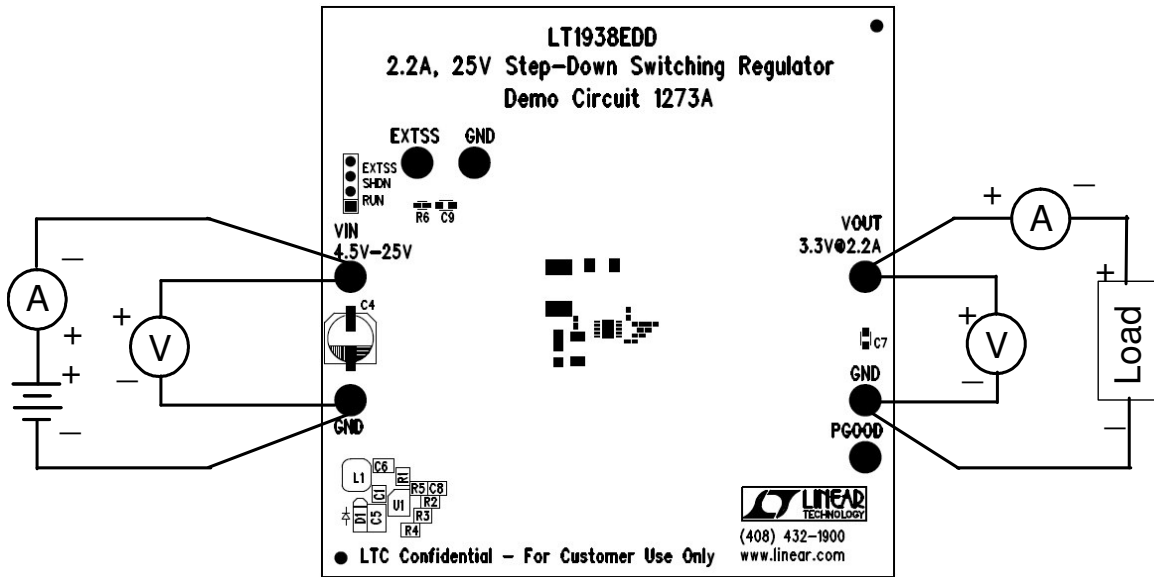


Figure 1. Proper Measurement Equipment Setup

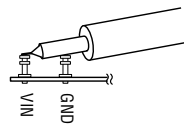
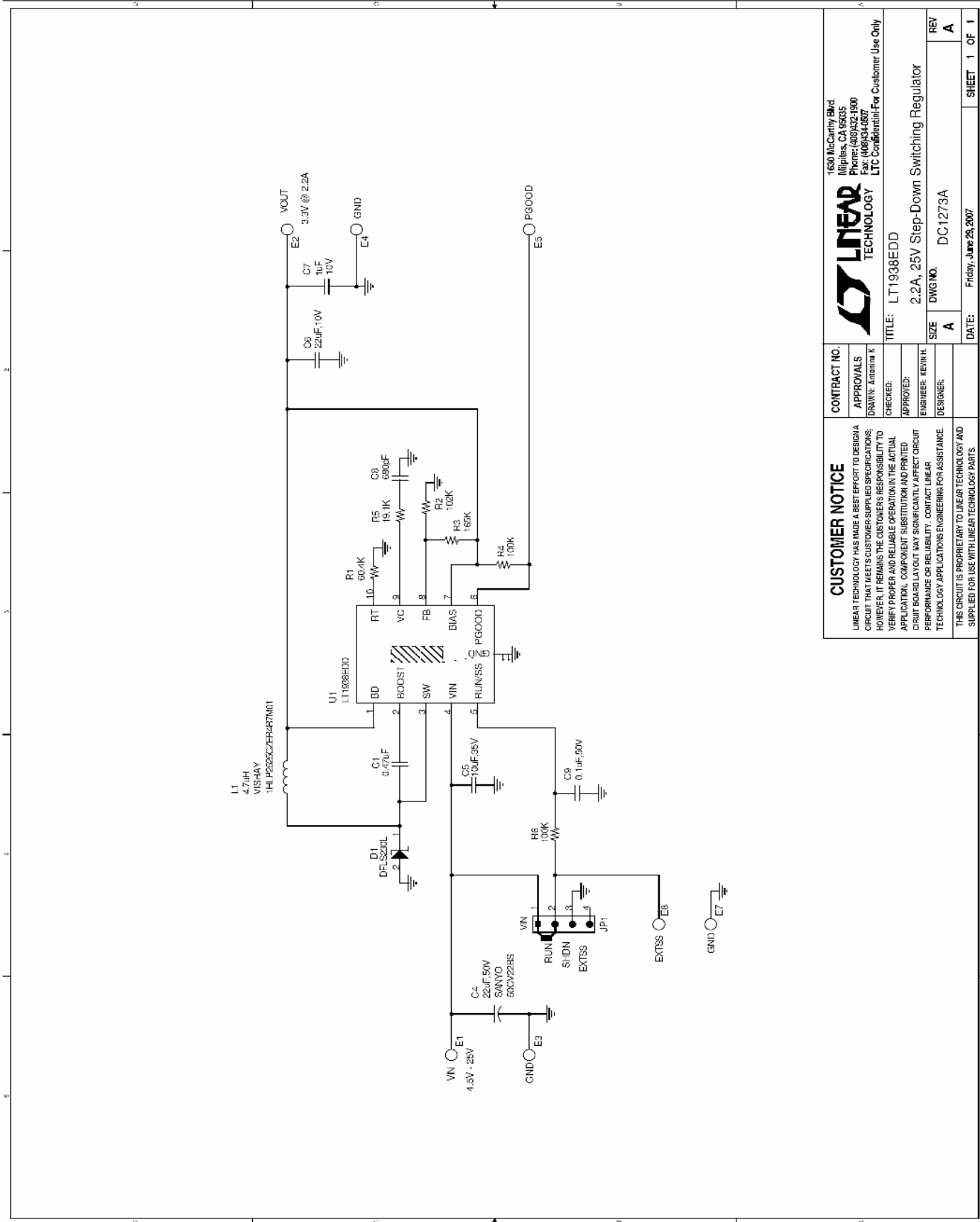


Figure 2. Measuring Input or Output Ripple



CUSTOMER NOTICE		CONTRACT NO.	
LINEAR TECHNOLOGY HAS MADE A BEST EFFORT TO DESIGN A CIRCUIT THAT MEETS CUSTOMER-SUPPLIED SPECIFICATIONS; HOWEVER, IT REMAINS THE CUSTOMER'S RESPONSIBILITY TO VERIFY PROPER AND RELIABLE OPERATION IN THE ACTUAL APPLICATION. COMPONENT SUBSTITUTION AND PRINTED CIRCUIT BOARD LAYOUT MAY SIGNIFICANTLY AFFECT CIRCUIT PERFORMANCE OR RELIABILITY. CONTACT LINEAR TECHNOLOGY APPLICATIONS ENGINEERING FOR ASSISTANCE.		LTC Confidential-For Customer Use Only	
THIS CIRCUIT IS PROPRIETARY TO LINEAR TECHNOLOGY AND SUPPLIED FOR USE WITH LINEAR TECHNOLOGY PARTS.		APPROVALS	
		DRAWN: Anirama K	
		CHECKED:	
		APPROVED:	
		ENGINEER: KEVIN H.	
		DESIGNER:	
		TITLE: LT1938EDD	
		2.2A, 25V Step-Down Switching Regulator	
		SIZE A	
		DWG NO. DC:1273A	
		DATE: Friday, June 29, 2007	
		SHEET 1 OF 1	